CLAIMS

What is claimed is:

1. A method of forming a mechanical joint, comprising:

molding a studded ball movably within a desired structure to form the mechanical joint, wherein the studded ball is configured for coupling to a desired mechanical linkage.

2. The method of claim 1, wherein molding comprises molding in place the studded ball in the desired structure.

3. The method of claim 1, wherein molding comprises self-retaining the studded ball within the desired structure.

4. The method of claim 3, wherein self-retaining comprises injecting mold material into a ball socket about the studded ball.

5. The method of claim 1, wherein molding comprises self-tolerancing the studded ball within mold material disposed about the studded ball.

6. The method of claim 5, wherein self-tolerancing comprises reducing mold contraction about, and fixation to, the studded ball.

7. The method of claim 1, wherein molding comprises creating a temperature differential between the studded ball and the desired structure.

8. The method of claim 7, wherein creating the temperature differential comprises heating the studded ball.

9. The method of claim 7, wherein creating the temperature differential comprises cooling the desired structure.

10. The method of claim 7, wherein creating the temperature differential comprises solidifying mold material from the desired structure inwardly to the studded ball.

11. The method of claim 1, wherein molding comprises providing a desired mold layer about the studded ball.

12. The method of claim 11, wherein providing the desired mold layer comprises symmetrically positioning the studded ball within the desired structure.

13. The method of claim 11, wherein providing the desired mold layer comprises positioning a spring-loaded mold assembly about opposite open portions of the desired structure.

14. The method of claim 13, wherein positioning the spring-loaded mold assembly comprises abutting centering structures against the studded ball and the desired structure.

15. The method of claim 1, wherein molding comprises centering the studded ball within the desired structure.

16. The method of claim 15, wherein centering comprises abutting first and second centering portions of first and second mold structures against the desired structure and the studded ball, respectively.

17. The method of claim 16, wherein abutting the first centering portion comprises disposing a mold injection nozzle sealingly against a first open portion of the desired structure.

18. The method of claim 17, wherein molding comprises injecting mold material and simultaneously pressuring the studded ball against the second centering portion.

19. The method of claim 18, wherein injecting mold material and simultaneously pressuring comprises sealing the studded ball against the second centering portion.

20. The method of claim 18, wherein molding comprises retracting at least one of the first and second centering portions prior to solidification of the mold material.

21. The method of claim 1, wherein molding comprises forming a plurality of molded in place layers about the studded ball.

22. The method of claim 21, wherein forming the plurality of molded in place layers comprises forming at least one low friction layer adjacent the studded ball.

23. The method of claim 1, comprising molding a ball onto a stud to form the studded ball.

24. A molding method for a mechanical joint, comprising:

injecting mold material into a cavity between a studded ball and a support structure for the studded ball; and

self-tolerancing the studded ball movably within the mold material.

25. The molding method of claim 24, wherein injecting comprises centering the studded ball within the support structure.

26. The molding method of claim 25, wherein centering comprises abutting first and second centering portions of a symmetrical mold assembly against the support structure and the studded ball, respectively.

27. The molding method of claim 26, wherein injecting comprises injecting mold material into the cavity adjacent the first centering portion and simultaneously forcing the studded ball against the second centering portion via fluid pressure of the injected mold material.

28. The molding method of claim 27, wherein simultaneously forcing the studded ball comprises fluidly sealing the studded ball against the second centering portion.

29. The molding method of claim 24, wherein injecting comprises automatically retaining the studded ball within the support structure.

30. The molding method of claim 29, wherein automatically retaining comprises solidifying mold material about the studded ball and into a socket in the support structure.

31. The molding method of claim 24, wherein self-tolerancing comprises facilitating heat transfer between the studded ball and the support structure.

32. The molding method of claim 31, wherein facilitating heat transfer comprises cooling the mold material inwardly from the support structure to the studded ball.

33. The molding method of claim 24, wherein injecting mold material comprises molding in place the studded ball in the support structure.

34. The molding method of claim 24, wherein injecting mold material comprises forming at least one molded in place layer having a low friction surface adjacent the studded ball.

35. A joint system, comprising:

a joint support structure;

a studded joint member disposed within the joint support structure; and

a desired material molded-in-place about the studded joint member and internally retained within the joint support structure, wherein the studded joint member is movable and self-toleranced within the desired material.

36. The joint system of claim 35, wherein the studded joint member comprises a ball-shaped head.

37. The joint system of claim 36, wherein the ball-shaped head is self-centered within the joint support structure.

38. The joint system of claim 37, wherein the desired material comprises a plastic.

39. The joint system of claim 37, wherein the joint support structure comprises an internal socket for the ball-shaped head.

40. The joint system of claim 37, wherein desired material molded-in-place about the studded joint member forms an inner bearing surface about the ball-shaped head.

41. The joint system of claim 40, wherein the inner bearing surface comprises thermodynamically enhanced characteristics provided by a temperature differential between the studded joint member and the joint support structure during in-place-molding of the desired material.

42. The joint system of claim 41, wherein the thermodynamically enhanced characteristics comprise a desired material contraction about the ball-shaped head.

43. A mold system for a ball joint assembly, comprising:

a molding assembly configured to self-tolerance and mold-in-place the ball joint assembly, comprising:

a stud receptacle for a studded joint member;

a first centering structure for the studded joint member;

a second centering structure for a support structure disposed about the studded joint member; and

a mold injection nozzle for injecting the desired mold material.

44. The mold system of claim 43, comprising a thermodynamic differentiator configured to provide a temperature difference between the studded joint member and the support structure.

45. The mold system of claim 44, wherein the thermodynamic differentiator comprises a heater for the studded joint member.

46. The mold system of claim 43, wherein the first centering structure comprises a ring-shaped section configured to abut the studded joint member.

47. The mold system of claim 46, wherein the mold injection nozzle is configured for pressurably injecting the desired mold material against the studded joint member to force the studded joint member sealingly against the first centering structure.

48. The mold system of claim 43, comprising a spring-loaded assembly configured to abut the support structure.

49. The mold system of claim 43, wherein the second centering structure comprises a plurality of centering tabs.

50. The mold system of claim 49, wherein the plurality of centering tabs comprises geometry configured to facilitate a desired thickness of the desired mold material about the studded joint member.

51. The mold system of claim 50, wherein the plurality of centering tabs comprises at least three symmetrically arranged tabs, which are configured to contact the support structure.